REMARKS

Claims 124 and 31-46 were originally pending in the application. Claims 1-10, 14-24, and 31-46 are rejected. Claims 11-13 are objected to. Claims 1, 6, 10, 31, 32, 38, 39, 41, and 42 have been amended. New claims 47-91 have been added. Claims 11-13 and 35 have been cancelled. Claims 1-10, 14-24, 31-34, and 36-93 are now pending. Favorable reconsideration and allowance of this application is respectfully requested in light of the foregoing amendments and the following remarks.

I. Claim objections

Claim 6 has been amended to insert --at least one—before "electrical". Claim 10 has been amended to delete "MEMS" before "element". These amendments are made in conformance with suggestions by the Examiner and are not made for reasons related to patentability, but rather are made for the purposes of form and clarity of the claims.

II. Claim rejections under 35 U.S.C. §112

Paragraph 5 of the Office Action rejects claims 31-37 and 41-46 under 46 USC §112, second paragraph.

In claim 31, "the at least one conductive element" has been amended to read "the stationary conductive element". An earlier recited "stationary conductive MEMS element" has been added to claim 31 for proper antecedent basis.

In claim 32, " the at least one stationary element" has been deleted and --the stationary conductive MEMS element-- substituted therefore.

In claim 41, "the conductive element" has been deleted and --the stationary conductive elements-- has been substituted therefore.

In claim 42, "the at least two conductive elements" has been deleted and --the stationary conductive elements-- has been substituted therefore.

III. Other claim amendments made for form and clarity

Claim 39 has been amended to delete "conductive" before "element" and substitute --stationary-- therefore. This amendment was not made for reasons related to patentability, but rather for the purposes of form and clarity of the claim.

IV. Brief discussion of prior art

Before addressing the individual claim rejections in view of the prior art, Applicant will briefly discuss each of the cited references to assist the Examiner during reconsideration of the pending claims.

The Bishop reference discloses a package 10 including a MEMS device 25 that is disposed within a cavity 20 and mounted on a first substrate 40. A second substrate 70 is bonded to the first substrate via one of several disclosed methods to encapsulate the MEMS device in the package. (See Col. 3, lines 33-48; Figs. 1 and 2). The MEMS device appears (based on Fig. 2) to include a cantilevered movable element that is hingedly connected to the first substrate 40 at one end, and may be pivoted downwardly at a second end to connect the second end with what appears to be a contact disposed on the upper surface of the substrate 40. Accordingly, Bishop discloses a variable-sized gap disposed between the movable element and the contact that extends perpendicular (rather than parallel) to the substrate to enable the MEMS device to function as an apparent switch. Furthermore, because Bishop's movable MEMS element is cantilevered, the movable element fails to define outer ends that are permanently connected to the substrate and a middle portion connected to the outer ends and free from the substrate.

Similarly, the Lin reference discloses a MEMS structure disposed on a silicon substrate. The MEMS structure includes a cantilevered comb-shape resonator anchored to the substrate via a first polysilicon pad at one end, and having a dimple disposed on the lower surface of the free end. The dimple is in removable engagement with a contact pad that is attached to the substrate (See Figs. 1a-1e). Accordingly, like Bishop, Lin discloses a variable-sized gap disposed between the movable element and the contact that extends perpendicular (rather than parallel) to the substrate to enable the MEMS device to function as a switch. Furthermore, because Lin's movable MEMS element is cantilevered, the movable element fails to define outer ends that are permanently connected to the substrate and a middle portion connected to the outer ends and free from the substrate.

Similarly, the Goodwin-Johansson reference ("Goodwin") discloses a MEMS device disposed on a substrate 10. The Office Action cites a pair of stationary elements 30 and 40 in mechanical communication with the substrate. The MEMS device includes a movable composite structure 60 having one outer end connected to the substrate at an attachment point

100. The opposite outer end of structure 60 is free from the substrate 10 (See Figs. 1-3, Col. 4, line 46-Col. 5, line 19.). In an alternate embodiment, an air gap 120 is disposed between the movable composite structure 60 and the insulator 50 on which the structure 60 is disposed (Fig. 8). However, as in the previous embodiment, only one outer end of the structure 60 is connected to the substrate. Accordingly, Goodwin's movable MEMS element fails to define outer ends that are permanently connected to the substrate and a middle portion connected to the outer ends and free from the substrate. Furthermore, Goodwin's gap is disposed between the movable element and the substrate, and extends perpendicular (rather than parallel) to the substrate to enable the MEMS device.

Accordingly, all cited prior art references fail to teach or suggest a MEMS structure having a stationary element extending from the substrate, and a movable MEMS element that is separated from a stationary element by a variable-sized gap extending generally parallel to the substrate. Furthermore, all cited prior art fails to teach or suggest a movable MEMS element that is connected to the substrate at its outer ends having a middle portion connected between the outer ends and free from the substrate, wherein the middle portion is disposed adjacent a stationary conductive element that extends from the substrate. Accordingly, as will be discussed below, the cited prior art differs both structurally and functionally from the claims now pending in the application.

V. Claim rejections under 35 U.S.C. §102

1. Claims 1, 4, and 5

Paragraph 11 of the Office Action rejects Claims 1, 4, and 5 under 35 U.S.C. §102(e) as being anticipated by Bishop. Claim 1 has been amended to recite 1 a variable sized gap that extends substantially parallel to the substrate and separates the movable MEMS element from the at least one conductive element. Neither Bishop nor the remaining cited prior art references teach or suggest this claimed structure, which enables the movable element to move in a lateral direction rather than a vertical direction as disclosed in the prior art references.

The Office Action appears to cite the contact (unnumbered in Fig. 2 of Bishop) that is attached to the substrate as a conductive element. However, Bishop's electrical traces 100 are connected to the movable MEMS element 25 rather than the stationary conductive element (Fig. 2; Col. 4, lines 55-63). Claim 1, on the contrary, recites that at least one

electrical trace has a first terminal end in electrical communication with the at least one conductive element. Claim 1 further recites a cap attached to the substrate inside the peripheral region having upper and side walls that encapsulate the at least one conductive element and the movable MEMS element. None of the cited references teach or suggest the presently claimed cap that encapsulates the claimed at least one conductive element and the movable MEMS element.

Accordingly, Applicant asserts the claim 1 and corresponding dependent claims 4 and 5 are allowable over the cited prior art. Withdrawal of the §102 rejection of these claims is respectfully requested.

Claims 31-32, 35, and 38-40

Paragraph 12 of the Office Action rejects claims 31-32, 35, and 38-40 under 35 U.S.C. §102(e) as being anticipated by Lin. Claim 35 has been cancelled.

Claim 31 has been amended to recite a movable MEMS element having outer ends permanently connected to the substrate and a middle portion connected between the outer ends and free from the substrate. None of the cited prior art references teach or suggest this claim limitation. As discussed above, the movable element disclosed in Lin is cantilevered and Lin therefore fails to teach or suggest the claimed structure. If the outer end of Lin's movable MEMS element were permanently attached to the contact, the switch would be rendered inoperable. While Goodwin illustrates a portion of the movable element 60 free from the substrate, only one end of the movable element is permanently connected to the substrate. The other end of Goodwin's movable element is cantilevered (See Fig. 8).

Furthermore, claim 31 as amended recites a gap that is disposed between the middle portion of the movable member and the stationary conductive element. Goodwin, Fig. 8 discloses that the gap 120 is disposed between the movable element 60 and a substrate insulator 50 rather than a conductive element. Moreover, claim 31 recites a cap attached to the substrate having upper and side walls that encapsulate the claimed stationary conductive MEMS element and the movable MEMS element. None of the cited references teach or suggest this claim limitation.

Claim 32 recites at least one electrical trace having a first terminal end in electrical communication with the stationary conductive MEMS element and a second terminal end in electrical communication with the peripheral region. Lin fails to teach or suggest this claim

limitation. Rather, the electrical trace provides a contact for the cantilevered end of the movable MEMS element and is not in electrical communication with a stationary conductive MEMS element that extends from the substrate.

Independent claim 38 recites at least one stationary conductive element that is in mechanical communication with the substrate, and a movable MEMS element disposed adjacent the at least one stationary conductive element. The Movable MEMS element has outer ends permanently connected to the substrate, and a middle portion connected between the outer ends and free from the substrate. At least one electrical trace has a first terminal end in electrical communication with the at least one stationary conductive element and a second terminal end in electrical communication with the peripheral region.

As discussed above, Lin and the remaining cited prior art references fail to teach or suggest the claimed stationary conductive element and movable MEMS element. Furthermore, none of the cited references teach or suggest an electrical trace having a first terminal end in electrical communication with the claimed stationary conductive element, as recited in claim 38.

Accordingly, Applicant asserts that independent claims 31 and 38, and corresponding dependent claims 32 and 39-40 are allowable over the cited prior art. Withdrawal of the rejection of these claims under 35 U.S.C. §102 is respectfully requested.

Claims 41 and 45-46

Paragraph 13 of the Office Action rejects claims 41 and 45-46 under 35 U.S.C. §102(e) as being anticipated by Goodwin.

Claim 41 has been amended to recite the first and second stationary elements in mechanical communication with the substrate are conductive, and that a movable MEMS element is disposed adjacent the stationary conductive elements. The movable MEMS element has outer ends permanently connected to the substrate, and a middle portion connected between the outer ends and free from the substrate. As discussed above, none of the cited prior art references teaches or suggests this claimed structure. In particular, Goodwin is incapable of fixing the outer ends of movable element 60 to the substrate, as the outer cantilevered member would be incapable of moving towards the electrodes 30 and 40. Claim 41 has been further amended to recite that the movable MEMS element is disposed laterally adjacent the stationary conductive elements. Goodwin, on the contrary, discloses

that the movable element 60 is vertically displaced from the electrodes 30 and 40. Furthermore, none of the cited prior art references teach or suggest these claim limitations.

Accordingly, Applicant asserts that independent claim 41 and corresponding dependent claims 45-46 are allowable over the cited prior art. Withdrawal of the rejection of these claims under 35 U.S.C. §102 is respectfully requested.

VI. Claim rejections under 35 U.S.C. §103

Paragraph 16 of the Office Action rejects claims 1-3, 6-10, 14-24, 31-34, 36-37, and 41-44 under 35 U.S.C. §103 as being unpatentable over Goodwin in view of Lin. Applicant has addressed all combinations of the cited prior art above with respect to the rejections under 35 U.S.C. §102. Because the cited prior art fails to teach or suggest all structural limitations in independent claims 1, 31, 41, Applicant asserts that these claims along with corresponding dependent claims 2-3, 6-10, 14-24, 32-34, 36, 37, and 42-44 are patentable over the cited prior art. Withdrawal of the rejection of these claims under 35 U.S.C. §103 is respectfully requested.

VII. Allowable Subject Matter

Applicant notes with appreciation the indication at Paragraph 17 of the Office Action that claims 11-13 contain allowable subject matter. Claim 11 has been cancelled and rewritten as independent claim 47 incorporating the limitations of claims 1, 10, and 11. Claims 12 and 13 have been rewritten as claims 48-49 and depend from new independent claim 47. Formal allowance of claims 47-49 is respectfully requested.

VIII. New Claims

As noted above, Applicant has added new claims 47-49 to the present application. For reasons already discussed, formal allowance of these claims is respectfully requested. New claims 50 and 51 have been added that depend from claim 47 and, accordingly, are also allowable over the prior art.

Applicant has also added new independent claim 52 and corresponding dependent claims 53-73 that are intended to correlate generally with claims 1-10 and 11-24. Claim 52 differs from claim 1 primarily in that the claimed movable MEMS element has outer ends permanently connected to the substrate and a middle portion connected between the outer ends that is free from the substrate and positioned such that a gap separates the middle

portion from the stationary conductive element. As discussed above, none of the cited prior art references teach or suggest at least these claim limitations. Accordingly, formal allowance of new claims 52-73 is respectfully requested.

New independent claim 74 and corresponding dependent claims 75-80 have been added and are intended to generally correlate with claims 31-37. Independent claim 75 differs from independent claim 31 primarily in that claim 75 recites a variable-sized gap that extends substantially parallel to the substrate and separates the movable MEMS element from the stationary element. As discussed above with reference to claim 1, none of the cited references teach or suggest at least this claim limitation. Accordingly, formal allowance of new claims 74-80 is respectfully requested.

New independent claim 81 and corresponding dependent claims 82-84 have been added and are intended to generally correlate with claims 38-40. Claim 81 recites a variable-sized gap that extends substantially parallel to the substrate and separates the movable MEMS element from the stationary element. New dependent claim 82 recites the movable MEMS element defines outer ends that are permanently attached to the substrate, and wherein the portion that is free from the substrate is connected between the outer ends. Accordingly, formal allowance of new claims 81-84 is respectfully requested.

New independent claim 85 and corresponding dependent claims 86-91 have been added and are intended to generally correlate with claims 41-46. Claim 85 recites first and second variable-sized gaps that extend substantially parallel to the substrate and separate the movable MEMS element from the first and second stationary elements. Dependent claim 86 recites the movable MEMS element defines outer ends that are permanently attached to the substrate, and wherein the portion that is free from the substrate is connected between the outer ends. Accordingly, formal allowance of new claims 85-91 is respectfully requested.

New independent claim 92 and corresponding dependent claims 93-97 have been added. Claim 92 recites a MEMS structure incorporating a wafer level cap that encapsulates the movable MEMS element. Claim 92 is also limited to a first substrate that supports the second substrate (which defines the stationary and movable elements) and a third substrate different than the first substrate that defines the cap. None of the cited prior art references teach or suggest a MEMS structure having a wafer-level cap that is comprised of three separate substrates. For instance, Bishop discloses an underlying substrate 40, a movable element 25, and a cap that is formed from firewall 30 and substrate 40. Accordingly, the cap

disclosed in Bishop is not formed from a substrate that is different than the underlying substrate, as recited in new claim 92. Goodwin-Johansson does not disclose a cap that encapsulates the movable element, and accordingly does not anticipate claim 92. Lastly, Lin discloses at Fig. 11A a first substrate providing a base, and a second micropackage substrate that provides the cap for a MEMS device. Lin does not disclose how the MEMS device in Fig. 11A is fabricated, but does state that MEMS devices are commonly fabricated using standard surface micromachining steps which ultimately produce a MEMS device mounted on a silicon wafer substrate (See Col. 2, lines 16-19). Lin thus teaches away from incorporating a MEMS device using a substrate as recited in claim 92. Accordingly, because none of the cited prior art references teach or suggest the limitations in claim 92, Applicant asserts that this claim along with corresponding dependent claims 93-97 are allowable over the cited prior art. Formal allowance of claims 92-97 is therefore respectfully requested.

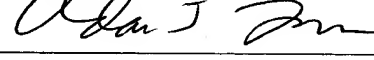
IX. Conclusion

Applicant therefore respectfully asserts that all rejections and objections cited by the Examiner have been overcome. Accordingly, the application is in condition for allowance, and a Notice of Allowance is earnestly solicited. The Examiner is invited to contact the undersigned at the telephone number appearing below if such would advance the prosecution of this application.

Applicant hereby authorizes the Commissioner to deduct the $1338 fee for the addition of five independent claims greater than three ($420), and the addition of fifty-one claims greater than twenty ($918), along with any other fees deemed necessary for this or any other communication, fee from Deposit Account No. 17-0055.

Respectfully submitted,

Richard D. Harris, et al.

By: 

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VERSION OF CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

1. (Once Amended) A MEMS structure comprising:

a substrate;

at least one conductive element that is in mechanical communication with the substrate and that extends therefrom;

a movable MEMS element having a portion that is free from the substrate and positioned such that a variable-sized gap extends substantially parallel to the substrate and separates the movable MEMS element from the at least one conductive element;

at least one electrical trace having a first terminal end in electrical communication with the at least one conductive element and a second terminal end in electrical communication with a peripheral region; and

a cap attached to the substrate inside the peripheral region having upper and side walls that encapsulate the at least one conductive element and the movable MEMS element.

6. (Once Amended) The MEMS structure as recited in claim 1, wherein the at least one electrical trace is selected from the group consisting of doped polysilicon, and a metal.

10. (Once Amended) The MEMS structure as recited in claim 1, wherein the at least one electrical trace is disposed within an interface between the at least one conductive [MEMS] element and the substrate.

11. Cancelled

12. Cancelled

13 Cancelled

31. (Once Amended) A MEMS structure disposed within a peripheral region comprising:

a substrate;

a movable MEMS element having [a distal end in mechanical communication with] outer ends permanently connected to the substrate, and a middle portion [disposed its two distal] connected between the outer ends and free from the substrate; [and]

a stationary conductive MEMS element in mechanical communication with the substrate and disposed adjacent the middle portion, wherein a gap is disposed between the middle portion and the stationary conductive MEMS element; and

a cap attached to the substrate having upper and side walls that encapsulate the [at least one] stationary conductive MEMS element and the movable MEMS element.

32. (Once Amended) The MEMS structure as recited in claim 31, wherein the cap separates the MEMS structure from the peripheral region, the MEMS structure further comprising:

[a stationary MEMS element in mechanical communication with the substrate and disposed adjacent the movable MEMS element; and]

at least one electrical trace having a first terminal end in electrical communication with the [at least one] stationary conductive MEMS element and a second terminal end in electrical communication with the peripheral region.

35. Cancelled

38. (Once Amended) A MEMS structure surrounded by a peripheral region, the MEMS structure comprising:

a substrate;

at least one stationary conductive element that is in mechanical communication with the substrate;

a movable MEMS element disposed adjacent the at least one stationary conductive element, and having [a distal end in mechanical communication with] outer ends permanently connected to the substrate, and a middle portion [disposed] connected between [its two distal] the outer ends and free from the substrate; and

at least one electrical trace having a first terminal end in electrical communication with the at least one stationary conductive element and a second terminal end in electrical communication with the peripheral region.

39. (Once Amended) The MEMS structure as recited in claim 38, further comprising a cap attached to the substrate inside the peripheral region having upper walls and side walls that encapsulate the at least one [conductive] stationary element and the movable MEMS element.

41. (Once Amended) A MEMS structure surrounded by a peripheral region, the MEMS structure comprising:

a substrate extending along a lateral direction;

[a] first and second stationary conductive elements in mechanical communication with the substrate;

a movable MEMS element disposed laterally adjacent the stationary conductive [element] elements, and having [a distal end in mechanical communication with] outer ends permanently connected to the substrate, and a middle portion [disposed] connected between [its two distal] the outer ends and free from the substrate; and

[a] first and second electrical [trace] traces having first terminal ends in electrical communication with the first and second stationary elements, respectively, and having second terminal ends in electrical communication with the peripheral region.

42. (Once Amended) The MEMS structure as recited in claim 41, further comprising a cap attached to the substrate inside the peripheral region having upper walls and side walls that encapsulate the [at least two conductive] stationary conductive elements and the movable MEMS element.

Please add the following new claims to the present application.

47. (New) A MEMS structure comprising:

a substrate;

at least one conductive element that is in mechanical communication with the substrate and that extends therefrom;

a movable MEMS element having a portion that is free from the substrate and positioned such that a gap separates the movable MEMS element from the at least one conductive element;

at least one electrical trace having a first terminal end in electrical communication with the at least one conductive element and a second terminal end in electrical communication with a peripheral region; and

a cap attached to the substrate inside the peripheral region having upper and side walls that encapsulate the at least one conductive element and the movable MEMS element,

wherein the at least one electrical trace is disposed within an electrically insulating interface between the at least one conductive MEMS element and the substrate.

48. (New) The MEMS structure as recited in claim 47 wherein the interface prevents any portion of the at least one electrical trace from being in electrical communication with the substrate.

49. (New) The MEMS structure as recited in claim 47 wherein the interface layer comprises one of silicon dioxide and silicon nitride.

50. (New) The MEMS structure as recited in claim 47 wherein the movable MEMS element has outer ends permanently connected to the substrate, wherein the portion free from the substrate is connected between the outer ends.

51. (New) The MEMS structure as recited in claim 47 wherein the gap is a variable-sized gap that extends substantially parallel to the substrate.

52. (New) A MEMS structure comprising:

a substrate;

at least one stationary conductive element that is in mechanical communication with the substrate and that extends therefrom;

a movable MEMS element having outer ends permanently connected to the substrate and a middle portion connected between the outer ends that is free from the substrate and

positioned such that a gap separates the middle portion from the at least one conductive element;

at least one electrical trace having a first terminal end in electrical communication with the at least one stationary conductive element and a second terminal end in electrical communication with a peripheral region; and

a cap attached to the substrate inside the peripheral region having upper and side walls that encapsulate the at least one stationary conductive element and the movable MEMS element.

53. (New) The MEMS structure as recited in claim 52, wherein the gap is a variable-sized gap that extends substantially parallel to the substrate.

54. (New) The MEMS structure as recited in claim 52, wherein the cap is non-conductive.

55. (New) The MEMS structure as recited in claim 54, wherein the cap is selected from the group consisting of glass, high resistivity silicon, crystalline sapphire, and ceramic.

56. (New) The MEMS structure as recited in claim 52, wherein the cap is conductive.

57. (New) The MEMS structure as recited in claim 56 wherein the cap is selected from the group consisting of silicon and metal.

58. (New) The MEMS structure as recited in claim 52, wherein the electrical trace is selected from the group consisting of doped polysilicon, and a metal.

59. (New) The MEMS structure as recited in claim 58, wherein the metal is selected from the group consisting of tungsten, titanium, nickel, and alloys thereof, and aluminum, copper, silver, and gold.

60. (New) The MEMS structure as recited in claim 52, wherein a bottom surface of at least one of the side walls of the cap is attached to the substrate.

61. (New) The MEMS structure as recited in claim 52, wherein the sidewalls are connected to the substrate at a location between first and second terminal ends of the at least one electrical trace.

62. (New) The MEMS structure as recited in claim 52, wherein the at least one electrical trace is disposed within an interface between the at least one conductive element and the substrate.

63. (New) The MEMS structure as recited in claim 52 wherein the substrate comprises a nonconductive material.

64. (New) The MEMS structure as recited in claim63, wherein a portion of the at least one electrical trace is in electrical communication with the substrate.

65. (New) The MEMS structure as recited in claim 52, wherein the substrate comprises a conductive material.

66. (New) The MEMS structure as recited in claim 52, wherein the substrate further comprises a recess formed in the upper surface thereof.

67. (New) The MEMS structure as recited in claim 66, wherein the movable MEMS element is disposed above and substantially aligned with the recess.

68. (New) The MEMS structure as recited in claim 52, wherein the movable MEMS element comprises at least one conductive member attached to a nonconductive base.

69. (New) The MEMS structure as recited in claim 68, wherein the nonconductive base is selectively etchable from the conductive member.

70. (New) The MEMS structure as recited in claim 68 wherein the nonconductive base comprises one of silicon dioxide and silicon nitride.

71. (New) The MEMS structure as recited in claim 52, wherein the substrate is selected from the group consisting of high resistivity silicon, crystalline sapphire, glass and ceramic.

72. (New) The MEMS structure as recited in claim 52 wherein the substrate is selected from the group consisting of silicon, silicon carbide, gallium arsenide, and metal.

73. (New) The MEMS structure as recited in claim 52, wherein the at least one conductive element is selected from the group consisting of silicon, silicon carbide, and gallium arsenide.

74. (New) A MEMS structure disposed within a peripheral region comprising:

a substrate;

a stationary element extending from the substrate;

a movable MEMS element having a portion that is free from the substrate and positioned adjacent the stationary element such that a variable-sized gap extends substantially parallel to the substrate and separates the movable MEMS element from the stationary element; and

a cap attached to the substrate having upper and side walls that encapsulate the movable MEMS element and the stationary element.

75. (New) The MEMS structure as recited in claim 74, further comprising at least one electrical trace having a first terminal end in electrical communication with the stationary element and a second terminal end in electrical communication with the peripheral region.

76. (New) The MEMS structure as recited in claim 74, further comprising

a second stationary element extending from the substrate and disposed adjacent the movable MEMS element; and

a second electrical trace having a first terminal end in electrical communication with the second stationary element and a second terminal end in electrical communication with the peripheral region.

77. (New) The MEMS structure as recited in claim 76, wherein the stationary elements are electrically isolated from each other.

78. (New) The MEMS structure as recited in claim 74, wherein the stationary element is conductive.

79. (New) The MEMS structure as recited in claim 74, wherein the movable MEMS element further comprises at least two conductive elements.

80. (New) The MEMS structure as recited in claim 79, wherein the at least two conductive elements are electrically isolated from each other.

81. (New) A MEMS structure surrounded by a peripheral region, the MEMS structure comprising:

a substrate;

at least one stationary element that is in mechanical communication with the substrate;

a movable MEMS element having a portion that is free from the substrate and positioned adjacent the stationary element such that a variable-sized gap extends substantially parallel to the substrate and separates the movable MEMS element from the stationary element; and

at least one electrical trace having a first terminal end in electrical communication with the at least one stationary element and a second terminal end in electrical communication with the peripheral region.

82. (New) The MEMS structure as recited in claim 81, wherein the movable MEMS element defines outer ends that are permanently attached to the substrate, and wherein the portion that is free from the substrate is connected between the outer ends.

83. (New) The MEMS structure as recited in claim 81, further comprising a cap attached to the substrate inside the peripheral region having upper walls and side walls that encapsulate the at least one stationary element and the movable MEMS element.

84. (New) The MEMS structure as recited in claim 83, wherein the second terminal end extends outside the cap.

85. (New) A MEMS structure surrounded by a peripheral region, the MEMS structure comprising:

a substrate;

first and second stationary elements in mechanical communication with the substrate;

a movable MEMS element having a portion that is free from the substrate and positioned adjacent the stationary elements such that first and second variable-sized gaps extend substantially parallel to the substrate and separate the movable MEMS element from the first and second stationary elements, respectively; and

first and second electrical traces having first terminal ends in electrical communication with the first and second stationary elements, respectively, and having second terminal ends in electrical communication with the peripheral region.

86. (New) The MEMS structure as recited in claim 85, wherein the movable MEMS element defines outer ends that are permanently attached to the substrate, and wherein the portion that is free from the substrate is connected between the outer ends.

87. (New) The MEMS structure as recited in claim 85, further comprising a cap attached to the substrate inside the peripheral region having upper walls and side walls that encapsulate the stationary elements and the movable MEMS element.

88. (New) The MEMS structure as recited in claim 87, wherein the second terminal ends extend outside the cap.

89. (New) The MEMS structure as recited in claim 88, wherein the second terminal ends are electrically isolated from each other.

90. (New) The MEMS structure as recited in claim 85, wherein the movable MEMS element further comprises at least two conductive elements.

91. (New) The MEMS structure as recited in claim 90, wherein the at least two conductive elements are electrically isolated from each other.

92. (New) A MEMS structure comprising:

a first underlying substrate;

a second substrate forming 1) at least one conductive element that is in mechanical communication with the substrate and that extends therefrom, and 2) a movable MEMS element having a portion that is free from the substrate and that defines a variable sized gap with respect to the at least one conductive element; and

a third substrate different than the first substrate defining a cap having a base that is in mechanical communication with the first substrate so as to encapsulate the movable MEMS element.

93. (New) The MEMS structure as recited in claim 92, further comprising at least one electrical trace having a first terminal end in electrical communication with the at least one conductive element and a second terminal end in electrical communication with a peripheral region.

94. (New) The MEMS structure as recited in claim 93, wherein the at least one electrical trace is embedded in a layer disposed between the first and second substrates.

95. (New) The MEMS structure as recited in claim 94, wherein the layer is insulating.

96. (New) The MEMS structure as recited in claim 92, wherein the variable-sized gap extends substantially parallel to the first substrate.

97. (New) The MEMS structure as recited in claim 92, wherein outer ends of the second substrate are connected to the first substrate, and wherein a middle portion of the second substrate is connected between the outer ends and free from the first substrate.